

[0025] When the stored first position information is corrected, generating a map may update the map based on the corrected first position information.

[0026] The acquiring a position of the docking station is performed by estimating a point, in which directions of the output signal, which is detected in a plurality of different positions during the body drives, are intersected.

[0027] The acquiring a position of the docking station is performed by estimating a direction of the output signal by filtering the output signal, which is detected in a plurality of different positions during the body drives, according to the probability based filtering method using Bayse filter.

[0028] The acquiring a position of the docking station is performed by estimating a direction of the output signal by filtering the output signal according to the probability based filtering method including at least one of Kalman Filter, Extended Kalman filter (EKF), Unscented Kalman filter (UKF), Information filter, Histogram Filter and Particle Filter.

[0029] The acquiring a position of the docking station is performed by measuring a direction of the output signal detected by the signal detector of the body, and by measuring a distance between the body and the docking station based on a type and an intensity of the output signal.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] These and/or other aspects of the invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompanying drawings of which:

[0031] FIG. 1 is a view illustrating an exterior of a robot cleaner and a docking station in accordance with an embodiment of the present disclosure.

[0032] FIG. 2 is a view illustrating an exterior of a robot cleaner.

[0033] FIG. 3 is a view illustrating an interior of a robot cleaner.

[0034] FIG. 4 is a view illustrating an interior of a robot cleaner.

[0035] FIG. 5 is a view illustrating a bottom surface of a robot cleaner.

[0036] FIG. 6 is a view illustrating a control configuration of a robot cleaner.

[0037] FIG. 7 is a view illustrating a configuration of a docking station in accordance with an embodiment of the present disclosure.

[0038] FIG. 8 is a view illustrating a type and a range of an infrared signal output from a docking station in accordance with an embodiment of the present disclosure.

[0039] FIG. 9 is a flow chart illustrating of correcting a map by acquiring a position of a docking station of a robot cleaner in accordance with an embodiment.

[0040] FIGS. 10A and 10B are views illustrating a method for correcting a position and a map of a robot cleaner in accordance with an embodiment.

[0041] FIG. 11 is flowchart illustrating of acquiring a position of a docking station of a robot cleaner in accordance with an embodiment of the present disclosure.

[0042] FIG. 12 is a view illustrating a reception region of a plurality of receivers installed in a robot cleaner in accordance with an embodiment of the present disclosure.

[0043] FIG. 13 is a view illustrating a method for detecting an infrared signal output from a docking station of a robot cleaner in accordance with an embodiment of the present disclosure.

[0044] FIG. 14 is a view illustrating a reception region according to a plurality of receivers installed in a robot cleaner in accordance with an embodiment of the present disclosure.

[0045] FIG. 15 is a view illustrating an example of a geometrical method to acquire a position of a docking station of a robot cleaner in accordance with an embodiment of the present disclosure.

[0046] FIG. 16 is a view illustrating an example of a probability based method to acquire a position of a docking station of a robot cleaner.

DETAILED DESCRIPTION

[0047] The present disclosure will be described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the present disclosure are shown. As those skilled in the art would realize, the described embodiments may be modified in various different ways, all without departing from the spirit or scope of the present disclosure.

[0048] Parts which are not associated with the description are omitted in order to specifically describe the present disclosure, and like reference numerals refer to like elements throughout the specification

[0049] The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used herein, the singular forms “a,” “an” and “the” are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms “comprises” and/or “comprising,” when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0050] It will be understood that, although the terms first, second, third, etc., may be used herein to describe various elements, but elements are not limited by these terms. These terms are only used to distinguish one element from another element. For example, without departing from the scope of the present disclosure, a first element may be termed as a second element, and a second element may be termed as a first element. The term of “and/or” includes a plurality of combinations of relevant items or any one item among a plurality of relevant items.

[0051] In addition, “touch” may be generated by any one of the fingers including a thumb, and a touchable input unit (e.g. stylus). “Touch” may include a hovering by any one of the fingers including a thumb, and a touchable input unit. In addition, “touch” may include a multi touch as well as a single touch. “body” may represent a body of a robot cleaner.

[0052] Reference will now be made in detail to embodiments of the present disclosure, examples of which are illustrated in the accompanying drawings.

[0053] FIG. 1 is a view illustrating an exterior of a robot cleaner and a docking station in accordance with an embodiment of the present disclosure and FIG. 2 is a view illustrating an exterior of a robot cleaner.